PB-214 058

EVALUATION OF THE OHIO WATER SUPPLY PROGRAM: SUMMARY

Environmental Protection Agency
Chicago, Illinois

July 1972

DISTRIBUTED BY:

NTIS

National Technical Information Service
U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151

PB 214 058

NATIONAL TECHNICAL
INFORMATION SERVICE

Evaluation of the Ohio Water Supply Program — Summary

U.S. Environmental Protection Agency

23

Evaluation

of the

Ohio Water Supply Program

Summary

U.S. Environmental Protection Agency
Region V
Division of Air and Water Programs
Program Support Branch
Water Supply Section

July 1972

Ia

Preface

The information contained in this Summary has been condensed from the Evaluation of the Ohio Public Water Supply Program. The Evaluation provides further discussion on the findings and needs, and more detailed recommendations regarding program operations.

The Summary highlights the most important findings and areas of major need. It is intended to conserve the time of those who do not wish to study the detail of the complete report. For more detailed information, the Ohio Department of Health, the Environmental Protection Agency, or the Evaluation should be consulted.

Table of Contents

	Page Number
Preface	i
Table of Contents	ii
Introduction	1
Scope	2
Water Supplies in Ohio	2
Water Supply Activities Evaluated	2
Summary of Findings and Conclusions	5
Community Water Supply Status	5
Surveillance Effectiveness	6
Inspections	6
Chemical Analyses	8
PHS Standards Run	8
Monthly Reports	9
Bacterial Sampling	9
Bacterial Quality	9
Community Water Supply Program	10
Semi-Public Water Supply Program	12
Resume	14
Recommendations	15
Acknowledgements	18
State and Federal Agency Addresses	19

Introduction

Historically, water has been involved in the transmission of much infectious disease, and many epidemics were sustained and spread by pathogenic organisms in water. With the advent and widespread application of modern water treatment techniques, especially filtration and disinfection with chlorine, water-borne disease occurrence declined dramatically until it became unusual for public water supplies to be implicated in disease transmission. Today there is evidence that public drinking water regulation and surveillance is not adequate to assure the continued safety of public water supplies. In the face of serious, increased water pollution, water pollution control programs have been greatly expanded. Such control programs, however, cannot alone assure safe drinking water. Both today and in the future, delivery of adequate quantities of safe, wholesome drinking water will depend upon properly designed, constructed, and operated water supplies and vigorous health agency regulation and surveillance.

In recognition of the importance of public water supplies to public health, Dr. John Cashman, Director, Ohio Department of Health accepted an offer of technical assistance in the conduct of a public water supply program evaluation by the Water Supply Section of the Environmental Protection Agency.

This evaluation was conducted to determine the effectiveness of the Ohio Public Water Supply Program and to determine what improvements, if any, are needed to assure safe, wholesome drinking water for the residents of Ohio.

Scope

Water Supplies in Ohio

1970 census figures show that over 10,650,000 people live in Ohio. About 8,720,000 of these people are served by 812 community water supplies. Many of the remaining 1,930,000 people live in rural areas and obtain their drinking water from private water supplies. In addition to the community water supplies, there are an unknown number (exceeding 2000) of semi-public water supplies which provide drinking water to residents and the traveling public in Ohio at restaurants, service stations, recreation facilities, camps, motels, industries and other similar establishments.

Water Supply Activities Evaluated

This evaluation dealt primarily with those water supply activities directed to the regulation and surveillance of community water supplies. Evaluation of those activities in semi-public and private water supply was limited to discussion of such activities with Division of Sanitation and Division of Engineering personnel. Evaluation of Department of Natural Resources activities in data development and planning with regard to drinking water use of Ohio's water resources was also limited to discussion with appropriate individuals.

Evaluation of the Community Water Supply Program included:

1. Indication of the status of community water supplies derived from review of the results of the 1969 Community Water Supply Study. (Community Water Supply Study- Cincinnati, Ohio Standard Metropolitan Statistical Area. Bureau of Water Hygiene, USPHS, Region V, July, 1970.)

2. Review of basic water supply statutes, regulations and program policies.

3. Review of Water Supply Unit activities in community water supply.

4. Review of District Office activities in community water supply.

5. Review of Department of Natural Resources activities in community water supply.

6. Review of District Office surveillance records on 154 community water supplies.

7. Conduct of a special study on fluoridation practice.

8. Survey and evaluation of the Department of Health Sanitary Chemistry Laboratory.

The community water supplies selected for evaluation of fluoridation practice and surveillance effectiveness are shown by Figure 1.

Figure 1

Evaluation of Community Water Supplies in Ohio

Distribution of Water Supplies Selected for Evaluation

LEGEND

x water supply systems whose records were examamined for surveillance effectiveness

○ fluoridated water supply systems selected for special study

Summary of Findings and Conclusions

Community Water Supply Status

The Community Water Supply Study of 1969 (CWSS) included the detailed evaluation and quality analysis of 33 water supplies in the Cincinnati area. For these 33 water supplies the CWSS showed:

Twenty-four percent of the supplies did not meet the bacterial quality standards one or more of the 12 months preceding the study. This deficiency was found only in supplies serving less than 10,000 people.

Fifty-eight percent of the supplies did not meet the bacterial sampling standards for the 12 month period preceding the study.

All of the supplies met the mandatory chemical drinking water standards for the single grab samples collected.

Twelve percent of the supplies did not meet one or more of the recommended chemical drinking water standards for the single grab samples collected.

No supply had chemical analyses made on an annual basis for more than 10 of the 26 parameters listed in the drinking water standards.

Ninety-one percent of the supplies did not provide fluoridated water.

Major facility deficiencies were found in over fifty-two percent of the supplies. These deficiencies were primarily in small facilities.

No supply had an effective cross connection control program.

One third of the supplies did not have certified operators.

Chlorine residuals were found to be inadequate in the distribution systems of seventy-three percent of the supplies.

Thirty-six percent of the supplies were not inspected by the Ohio Department of Health in the three years preceding the study.

In the one and one-half years following the CWSS the Ohio Department of Health had taken three major steps to improve surveillance. These steps were increased emphasis on annual inspections, development of an organized program of complete chemical analysis for all supplies annually, and preparation of a cross connection control regulation.

Surveillance Effectiveness

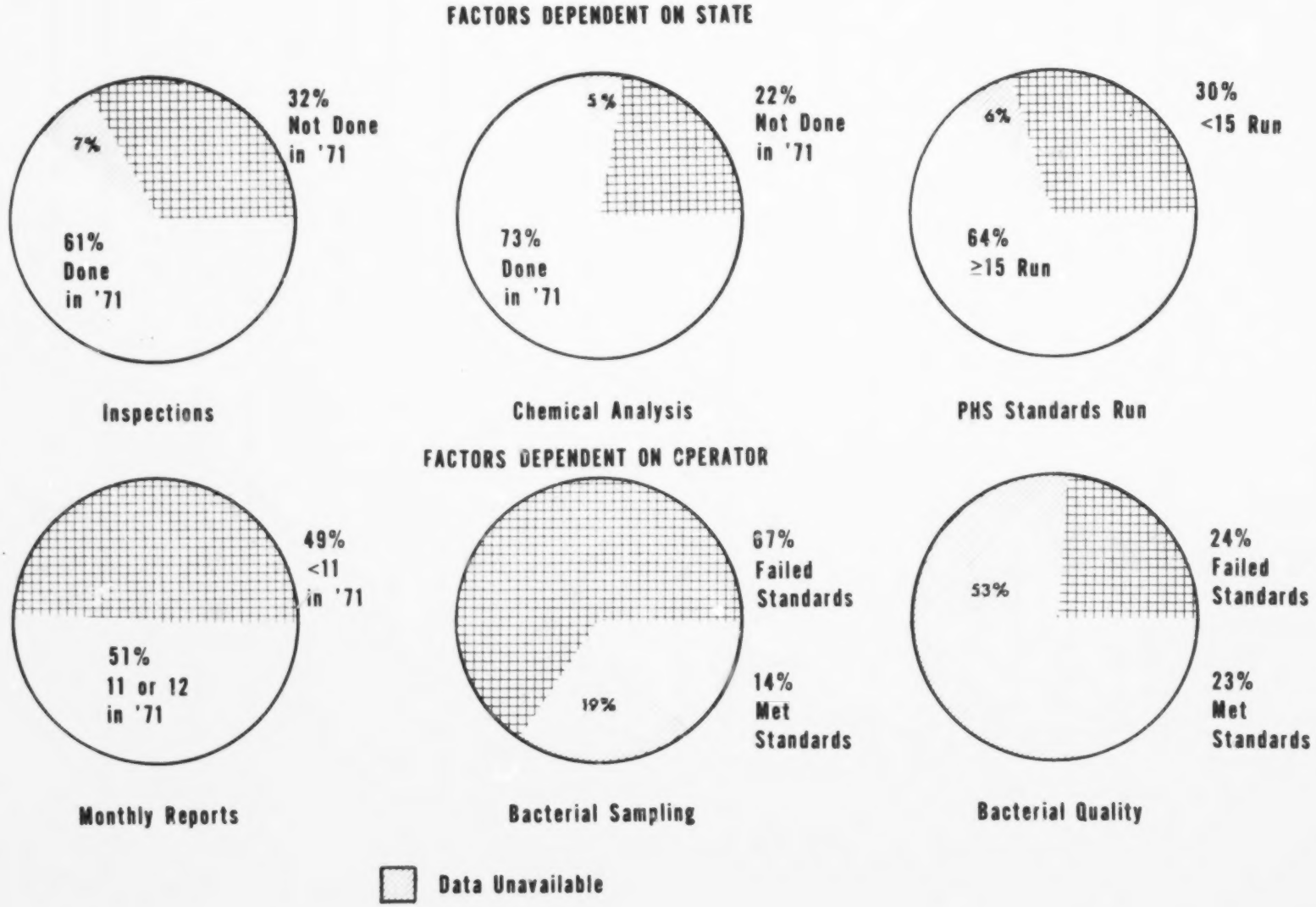
The evaluation of District Office records for twenty percent of the community water supplies listed in the "1968 Municipal Water Supply Inventory" revealed serious deficiencies in the community water supply program. Six parameters selected for evaluation are illustrated in Figure 2. Inspections, Chemical Analysis, and PHS Standards Run depend upon State action. Monthly Reports, Bacterial Sampling and Bacterial Quality depend upon operator action. Date unavailable means inadequate record keeping except for the case of bacterial quality where inadequate bacterial sampling causes a high percentage of data unavailable.

Inspections

Periodic inspections are important to the continued satisfactory operation of facilities producing a safe, wholesome product. Failure to

Figure 2

Community Water Supply Surveillance in Ohio



conduct such inspections providing technical assistance and direction as well as critical review, results in deterioration of the facility and its operation. Such a deterioration can create serious potential health hazards. Although the frequency such inspections should be conducted varies, both national and State policy establishes an annual frequency as the minimum necessary for effective surveillance.

Annual inspections were completed in 1971 for sixty-one percent of the community water supplies.

Chemical Analyses

The increase in water pollution problems which has been recognized nationwide, makes routine chemical analysis important to assure that pollution components are not entering drinking water supplies. State policy requires annual sampling of all supplies and quarterly sampling of surface water supplies.

Seventy-three percent of the community water supplies were provided with chemical analyses in 1971. Ninety-five percent of the supplies serving more than 5,000 people and 100 percent of the surface water supplies received this service.

PHS Standards Run

The Drinking Water Standards include those parameters most likely to occur in drinking water and those which have adequate data available to estimate potentially toxic levels and to establish workable limits. During 1971 the Sanitation Chemistry Laboratory routinely ran 16 parameters included in the Drinking Water Standards.

Sixty-four percent of the supplies were provided in 1971 with analyses of 15 or more parameters listed in the Drinking Water Standards.

Monthly Reports

The Ohio Department of Health requires monthly reports from each community water supply in order to maintain pertinent, up-to-date information regarding each supply and its operation.

Fifty-one percent of the supplies submitted the required reports for 11 or 12 months in 1971.

Bacterial Sampling

Bacterial quality can only be gauged by frequent examination of samples collected from representative points throughout the distribution system. The Drinking Water Standards establish monthly sampling frequencies for determination of bacterial quality. Data was considered inadequate to determine quality where the Standards had not been met seven or more months of 1971.

Sixty-seven percent of the supplies failed to meet the bacterial sampling standards two or more months in 1971. Data was unavailable in the District Offices for nineteen percent of the supplies.

Bacterial Quality

The Drinking Water Standards recognize the coliform group as a reliable indicator of the disease producing potential of drinking water. Failure to meet the bacterial standards indicates the drinking water is a potential carrier of infectious disease. Such a situation is a serious, potential health hazard and calls for prompt corrective action.

Twenty-four percent of the supplies failed to meet the bacterial standards one or more months in 1971. In addition, fifty-three percent of the supplies had inadequate bacterial data available to make judging the bacterial quality possible.

Community Water Supply Program

The funds expended for community water supply protection in Ohio are inadequate to accomplish effective surveillance. The Division of Engineering administers the program with funds estimated at $126,000 (FY 1971 including District Office staffing and travel). Laboratory support is administered by the Division of Laboratories with funds estimated at $84,000 (FY 1971). Including laboratory support about 2.5 cents per capita served per year is spent on protection of community water supply. A study of the 1970 budgets for State and territorial water supply programs showed that Ohio had one of the lowest per capita expenditures (53rd out of 56 programs).

Staff limitations, particularly in the District Offices, have prevented the Water Supply Unit from fulfilling its responsibilities. The Community Water Supply Study of 1969 found many deficiencies in supplies and their operation. Due to the fact that only 2.9 man years of professional staff were available in 1971 for surveillance work, surveillance was often performed in a cursory manner seriously reducing the effectiveness of the program. The evaluation of surveillance performance parameters reveals gross inadequacies in bacterial quality surveillance and monthly operational reporting.

The Department of Health has been reluctant to issue orders for correction of water supply deficiencies. Primary reasons for this appear to be lack of specific regulations on design and water quality required, lack of expeditious administrative and judicial process, and lack of well oriented legal aid and assistance in preparing cases for action.

Current community water supply regulations deal with the processes for plans review, operator certification, and cross connection control. Standards for bacterial, chemical, radiochemical, and physical drinking water quality are not specified in the regulations. Design standards for plans are not specified in the regulations. State law does not apparently authorize the Department of Health to establish drinking water quality standards. No provision is made for the orderly development of new community water supplies.

The Division of Engineering's community water supply policy is contained in a number of documents and memoranda issued over a number of years. The lack of a single complete policy document makes agency-wide knowledge of the policies and uniform application difficult.

Two hundred-forty-one (241) community water supplies are required by Division of Engineering policy to obtain bacterial analyses from non-State laboratories. One hundred-sixty-five (165) supplies presently use one hundred-fifty-three (153) laboratories which are certified every three years by the Division of Laboratories. The State provides excellent bacterial and chemical analysis service. The chemical analysis service has improved markedly in the past two years. Certification of non-State laboratories providing surveillance analyses (the required annual

or quarterly chemical samples as distinguished from the daily or weekly chemical samples [operational analyses]) is not provided.

Effective utilization of computer services has not been obtained. The large amounts of data which are collected must be processed and analysed by "hand." Consequently, the data are seldom given proper attention and are not effectively assimilated to direct program activities since the process is too time consuming.

The Department of Natural Resources develops large amounts of data regarding the use of Ohio's water resources for drinking water. Effective Statewide control over well drilling activities is not possible with the varied licensing and regulation programs now administered by some county governments. Well log reporting, although required by law, is not uniformly provided by well drillers.

The Department of Natural Resources is also active in water supply planning and plan implementation. Development of the planning and plan implementation programs is necessary to effect orderly development of new community water supplies.

Liaison between the water supply programs of the Department of Natural Resources and the Department of Health is not closely established. Data available in one Department is not readily available to programs of the other Department.

Semi-Public Water Supply Program

Responsibilities for semi-public water supply activities are shared by the Division of Sanitation, the Division of Engineering, and local Boards of Health. The Division of Engineering provides review of plans

and inspects sites for proposed water sources. In most cases local Boards of Health are responsible for sanitation inspections of semi-public facilities. These inspections include examination of semi-public water supplies which may be in use. The Division of Sanitation provides training for local sanitarians, establishes policy for semi-public water supply inspection, and evaluates the performance of local Boards of Health in implementing State requirements for sanitation control. Direct administration of sanitation inspections is conducted by the Division of Sanitation for agricultural labor camps and State parks.

Data regarding each semi-public water supply is maintained in local Board of Health records. Although estimates of the total numbers of semi-public water supplies is available for certain categories of such supplies, there is no Statewide inventory of these supplies showing information specific to each supply.

Semi-public water supply surveillance is conducted as part of the sanitary inspection of semi-public facilities which includes five to fifteen different subjects for consideration. Water supply is considered one of the subjects of prime importance. State policies on bacterial and chemical sampling for semi-public water supplies are very minimal. No chemical standards are established and no chemical samples are required. Bacterial sampling policy is not specified or is limited to one sample per year. Policies regarding water supply quality, source and development are poorly defined for food service operations. More detailed policies are developed for schools, camps, and trailer parks. It is noted here that reference to Ohio Department of Health standards

for quality, location, and construction is invalid since there are no such official standards. Limited guidelines are found in "Water Supply Sewerage and Sewage Treatment for Public Buildings, in Ohio."

Evaluations of the various semi-public facility sanitation programs are conducted by Division policy every three years. Such evaluations are required by law for food service operations sanitation programs. Over fifty percent of the trailer park, camp, school, and swimming pool sanitation programs have not been evaluated since 1968. Although the Division of Sanitation considers semi-public water supply surveillance to be adequate, there is no data readily available to demonstrate this statement as fact.

Résumé

The Ohio Community Water Supply Program is not providing the health evaluation and engineering services necessary to fulfill its responsibilities to protect the health of the citizens of Ohio. Well established standards of good practice are not being universally applied in Ohio. This study documents that many water supplies are not provided with adequate quality control. It is evident that Ohio must pursue an expanded community water supply program in order to assure an adequate supply of safe drinking water on a continuing basis.

Only limited information was obtained on the semi-public water supply program. This information demonstrates that policies defining water quality and its determination are weak. An evaluation specific to semi-public water supply should be conducted to determine the adequacy of semi-public water supply surveillance provided by local Boards of Health.

Recommendations

It is recommended that:

1. The community water supply program be identified in budget planning, appropriations, and accounting as a line item. A minimum annual budget of $600,000 should be provided. The funds should be used for:

Community Water Supply Activities (Water Supply Unit and District Offices)	$400,000
Laboratory Support	200,000
	$600,000

2. The public water supply program (headquarters and District Offices) be staffed with a minimum of twenty professional staff on community water supply activities.

3. The District Offices be made responsible to the headquarters water supply program to achieve adequate surveillance with at least three professional personnel assigned full time per District to community water supply activities.

4. The Division of Engineering increase and improve surveillance of public water supplies to the levels specified by Division of Engineering policy. These levels include:

   a. Annual sanitary surveys of each community water supply. Priorities and time schedules should be established for eliminating deficiencies.

   b. Detailed sanitary surveys every three years for each community water supply.

   c. Bacterial surveillance and monthly reporting meeting State established requirements. This requires cooperation of water supply operators (see recommendation 8.c.)

d. Complete routine chemical analysis of all community water supplies.

5. Semi-public water supplies be inventoried. An evaluation of the semi-public water supply surveillance provided by local Boards of Health be conducted.

6. Automatic data processing techniques be used for storage, analysis, and retrieval of water supply data.

7. The water supply functions of data development on raw water sources and water supply planning within the Department of Natural Resources and of community water supply activities within the Department of Health be closely coordinated and utilize the same data storage and retrieval system.

8. The water supply regulations be revised and expanded to more comprehensively reflect current recommended water supply practice. The following specific features should be included:

a. Quality standards for finished drinking water.

b. Mandatory disinfection of all community water supplies.

c. Continuation of certification dependent upon operator compliance with State requirements for the operation of a water supply.

d. Definition of community water supply and semi-public water supply.

e. Design standards for water supply development.

f. Application of quality and design standards to semi-public water supplies.

9. A uniform Statewide regulation controlling drilling practice be established with enforcement through licensing and periodic State evaluation of performance.

10. Policies and regulations be established to provide for and control the orderly development of new community water supplies. These policies and regulations should discourage the proliferation of small independent supplies and should encourage the consolidation of supplies.

11. A single document be prepared and distributed to all District Offices and community water supplies which presents all current Ohio public water supply program policy. Provision should be made for updating this document as policy revisions occur.

12. Legal support sufficient to provide legal consultation and to take timely action against violations of State water supply laws and regulations be provided to the Water Supply Unit.

Acknowledgements

The assistance and cooperation of Mr. Earl Richards, Chief Engineer, Division of Engineering, Ohio Department of Health is gratefully acknowledged. The Division of Engineering, Water Supply Unit, General Engineering Unit and District Office personnel gave freely of their time in providing information for the study. Personnel of the Division of Sanitation under Mr. Ray B. Watts and personnel of the Bureau of Laboratories under Dr. Charles C. Croft cooperated in the study. Information was also provided by personnel of the Department of Natural Resources through Mr. Robert O'Bryant, Deputy Director, Office of Planning and Research, Department of Natural Resources.

State and Federal Agency Addresses

A. State

Ohio Department of Health
450 East Town Street
Columbus, Ohio 43216
Telephone: 614-469-3543

B. Federal

Environmental Protection Agency, Region V
Water Supply Section
1 North Wacker Drive
Chicago, Illinois 60606
Telephone: 312-353-7736

Environmental Protection Agency
Water Supply Programs Division
Room 821, Crystal Mall Building #2
Washington, D.C. 20460
Telephone: 703-557-7380